



The Storage Environment

A Guide for Institutions and the Public

Summary: The storage environment in which records are housed can have a dramatic effect on their long-term physical condition, as well as on the information contained. Key environmental factors are: temperature, relative humidity, pollutants and light.

Air may contain excessive moisture, pollutants, microorganisms, and other particulates that accelerate the deterioration of paper. Dirt and dust particles can scratch film and tape emulsions and carry pollutants that may promote paper degradation.

Because records do not possess the human ability to recuperate, preventive means are the key to minimizing damage from the environment. Controlling temperature, relative humidity, and light and keeping the environment clean can have a dramatic effect on the longevity of records.

Temperature and Relative Humidity

Records exposed to high levels of heat, humidity, light, and dirt degrade more quickly than records stored under conditions that are cool, dry, dark, and clean. Research has shown that cooler temperatures can dramatically reduce the rate of degradation of records in all formats.

A target temperature and relative humidity for storing records comprised of a variety of formats (paper, bound materials, photographs and negatives, magnetic media) is as follows:

Temperature: 68°-72° Fahrenheit, plus or minus 2°F

Relative Humidity: 40% -55%, plus or minus 5%

Keep in mind that the recommended temperature is much lower for collections that primarily comprise magnetic media and photographs. These materials are far more susceptible to environmental fluctuations than paper based collections. Regardless of format, the ultimate goal is to provide a stable environment, keeping as close as possible to the levels suggested with minimal fluctuations.

Some heating and cooling systems come with programmable thermostats that provide varying temperature schedules. While these may save fuel by shutting down the system, they will also increase the period of time that records are not stored under desired conditions. Keep conditions as consistent as possible. Maintain the environmental conditions at the same temperature and relative humidity 24 hours a day, seven days a week.

Do not store permanent records in attics, basements, under skylights or in barns, equipment sheds, or any other facility lacking the capacity for heating and cooling as needed.



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Determining the mold species is an important first step in addressing the mold outbreak. Some molds can present very serious health concerns. Even dormant (dry or powdery) mold spores can be readily redistributed within a storage space, becoming active (velvety) when environmental conditions are favorable for growth.

If a small quantity of records is discovered with mold, they should be isolated from other materials for cleaning. Larger mold outbreaks may require quarantining a portion of a building, or even temporarily closing the building to the public.

It's essential to pinpoint the cause of the outbreak so to prevent future occurrences. Even after cleaning the records and area where they were stored, if favorable conditions for mold return, so will the mold. Lowering temperature and relative humidity levels and increasing air circulation are usually required to discourage future mold growth.

Light

Light, whether natural or artificial, can weaken some materials, causing them to fade or darken. Damage from light is irreversible, and the effects of exposure accumulate over time. Records exposed to a dim light for a long time will ultimately show the same effects as if exposed to a bright light for a short time. Reduce exposure to the greatest degree possible.

Cover windows with shades or drapes that block light entirely. Blocking light in this manner will also help keep a more stable temperature by reducing solar heat gain. Turn off interior lights when not in use. Storing materials in folders and boxes is an excellent way to protect records from light.

Dust and Pollutants

State-of-the-art repositories use chemical filtration to remove pollutants from the air. Even without an expensive filtration system, there are a number of ways to limit the effects of pollutants.

One important way is to house records within folders and boxes that meet the American National Standards Institute (ANSI) standard for permanence, Z39.48-1992. The alkaline reserve in these materials will serve as a buffer between the contents and a potentially harsh environment. Boxes and folders meeting the ANSI standard will create a stable micro-environment for permanent records.

Maintain an overall environment that is as dust-free as possible.

- Change heating, ventilation and air-conditioning (HVAC) system filters on a regular schedule, e.g., quarterly.
- Use vacuum cleaners equipped with high-efficiency, particulate air (HEPA) filters if possible, so as not to redistribute dust.
- Avoid introducing materials that create internal pollutants, such as wooden cabinets and shelves, cleaning compounds, and carpeting.
- Do not store records near copying machines, which produce ozone and dust from toner.

Mold

Excessive heat, poor air circulation, and relative humidity above 65% can provide a suitable climate for mold growth. High humidity is especially problematic in basements, where ground water and cooler temperatures encourage water vapor to collect. The appearance of mold indicates a serious condition -- take immediate action.

When mold occurs, reduce the temperature and relative humidity. Do not move records or try to remove mold from records without first consulting with preservation personnel.

Pests

A pest infestation not only creates anxiety among staff -- it can cause significant damage to records. Insects are generally a barometer of another environmental problem, such as high relative humidity, gaps in the building envelope, or poor housekeeping.

Remove trash daily from inside the building, and do not allow collected trash to accumulate in areas directly outside the building. A clean and environmentally-controlled building will discourage pests from making their home in storage areas.

Unless there is a specific problem to be addressed, avoid regularly scheduled chemical treatments. There is no all-purpose chemical for eliminating every pest problem. Moreover, chemicals that emit strong odors may create long-term problems for staff, records, and record users. Glue traps contain no chemicals and are useful for determining the existence and type of pest present. Such monitoring devices can be furnished by your local pest control technician or purchased in hardware stores.

Limiting food and beverages to designated areas, monitoring the environment, using identification and least toxic eradication methods first, and working with your pest control technician are all part of a preventive approach known as integrated pest management, or IPM. A pest infestation inside records boxes indicates a serious condition. Consult preservation personnel immediately.

Resources and Publications

By providing an optimal environment for the records entrusted to your care, you help to assure the preservation of your community's unique heritage for present and future generations of Georgians.

For more information, please call 678-364-3761 to contact Preservation Services at the Georgia Archives, a division of the Office of Secretary of State.

Appelbaum, Barbara. *Guide to Environmental Protection of Collections*. Madison, CT: Sound View Press, 1991.

Lull, William P., and Paul Banks. *Conservation Environment Guidelines for Libraries and Archives*. Ottawa: Canadian Council of Archives, 1995.

Pinninger, David. *Pest Management in Museums, Archives and Historic Houses*. London: Archetype, 2001.